Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (currently amended) A nonresonant micromachined gyroscope comprising:

a drive-mode oscillator; and

a sense-mode oscillator, where the drive-mode oscillator and sense-mode oscillator~~s~~ are dynamically mechanically decoupled and employ three interconnected proof masses.

2. (currently amended) The nonresonant micromachined gyroscope of claim 1 wherein the drive-mode oscillator and sense-mode oscillator by means of their chosen design parameters relating to coupling constants and mass dynamically amplify movement in a ~~the~~ drive direction and in a sense direction~~s~~ to achieve large oscillation amplitudes without resonance whereby increased bandwidth and reduced sensitivity to structural and thermal parameter fluctuations and damping changes results.

3. (currently amended) The nonresonant micromachined gyroscope of claim 1 wherein at least one of the three proof masses is included in an ~~enlarged proof~~ intermediate mass and another one of the three proof masses is a sensing element, where the intermediate mass is larger than the sensing element, and wherein the drive-mode oscillator and sense-mode oscillator are dynamically mechanically decoupled in

the drive direction from the sense direction ~~whereby robustness and long-term stability is achieved~~, so that ~~the~~ a Coriolis force generated by means of the larger ~~enlarged~~ intermediate ~~proof~~ mass results in a corresponding larger Coriolis force~~s~~ being transferred to the sensing element for increased sensor sensitivity ~~whereby control system requirements and tight fabrication and packaging tolerances are relaxed, mode-matching is eliminated, and instability and zero-rate drift due to mechanical coupling between the drive and sense modes is minimized~~.

4. (currently amended) The nonresonant micromachined gyroscope of claim 1 wherein the drive-mode oscillator and sense-mode oscillator include a drive means for driving a mass in a drive direction and a sense means for sensing motion of a mass in a sense direction, and wherein the three interconnected masses comprise a first mass, a second mass and a third mass, the first mass being the only mass directly excited by the drive means, the first mass oscillating in the drive direction and the first mass being constrained from movement in the sense direction, the second and third masses being constrained from movement with respect to each other in the drive direction and oscillating together in the drive direction but oscillating independently from each other in the sense direction, the third mass being fixed with respect to the second mass in the drive direction, but free to oscillate in the sense direction, the first mass as a driven mass and the second and third masses collectively as a passive mass comprising the drive-mode oscillator, the second and third masses comprising the sense-mode oscillator.

5. (currently amended) The nonresonant micromachined gyroscope of claim 4 wherein the second mass oscillates in the drive and sense directions to generate a rotation-induced ~~Coriolis~~ force that excites the sense-mode oscillator, and where a sense direction response of the third mass, which comprises ~~the~~ a vibration absorber of the sense-mode oscillator, is detected for measuring ~~the~~ an input angular rate.

6. (currently amended) The nonresonant micromachined gyroscope of claim 1 wherein the three interconnected masses comprise a first mass, a second mass and a third mass, where the first mass is anchored to the substrate by a first flexure which allows movement substantially only in the drive direction, where the second mass is coupled to the first mass by a second flexure that allows movement in the drive and the sense directions, and where the third mass is coupled to the second mass by a third flexure which allows movement relative to the second mass substantially only in the sense direction, and

wherein the drive-mode oscillator and sense-mode oscillator comprise a drive means for driving the first mass, the second mass and the third mass ~~a mass~~ in a drive direction, a sense means for sensing motion of ~~another~~ the third mass in a sense direction, and a substrate on which the drive-mode oscillator and sense-mode oscillator are disposed~~, wherein the three interconnected masses comprise a first, second and third mass, where the first mass is anchored to the substrate by a first flexure which allows movement substantially only in the drive direction, where the second mass is coupled to the first mass by a second flexure that allows movement in the drive and the sense directions, and where the third mass is coupled to the second mass by a third~~

~~flexure which allows movement relative to the second mass substantially only in the sense direction~~.

7. (previously presented) The nonresonant micromachined gyroscope of claim 6 wherein the first, and third flexures are folded micromachined springs having a resiliency substantially in only one direction and wherein the second flexure is comprised of two coupled folded micromachined springs, each having a resiliency substantially in only one of two different directions.

8. (previously presented) The nonresonant micromachined gyroscope of claim 1 wherein the drive-mode oscillator and sense-mode oscillator are arranged and configured to each have a frequency response with two resonant peaks and a flat region between the peaks, the gyroscope being operated at a frequency in the flat regions of the frequency responses of the drive and sense-mode oscillators.

9. (currently amended) The nonresonant micromachined gyroscope of claim 8 wherein the drive-mode oscillator has a drive direction anti-resonance frequency, wherein the sense-mode oscillator has a sense direction anti-resonance frequency, and where the drive-mode oscillator and sense mode oscillator are arranged and configured to have matching drive and sense direction anti-resonance frequencies.

10. (currently amended) The nonresonant micromachined gyroscope of claim 1 ~~wherein the drive-mode oscillator and sense-mode oscillator comprise a drive means for driving a mass in a drive direction, and a sense means for sensing motion of a mass in a sense direction,~~ wherein the three interconnected masses comprise a first mass, a second mass and a third mass and coupled flexures, where the first mass oscillates, the second and the third masses combining to comprise a vibration absorber of the drive-mode oscillator, which vibration absorber mechanically absorbs and amplifies the oscillations of the first mass and wherein the drive-mode oscillator and sense-mode oscillator comprise a drive means for driving the first mass, the second mass and the third in a drive direction, and a sense means for sensing motion of the third mass in a sense direction.

11. (currently amended) The nonresonant micromachined gyroscope of claim 10 wherein the first mass is driven at a driving frequency, ω_{drive}, by means of a input force F_d, which driving frequency, ω_{drive}, is matched with ~~the~~ a resonant frequency of an isolated passive mass-spring system comprised of the second and third masses and coupled flexures, which passive mass-spring system in resonance with ~~moves to cancel out the input force Fd applied to~~ the first mass, so that maximum dynamic amplification is achieved.

12. (currently amended) The nonresonant micromachined gyroscope of claim 1 ~~wherein the drive-mode oscillator and sense-mode oscillator comprise a drive means for driving a mass in a drive direction, and a sense means for sensing motion of a mass in~~

~~a sense direction,~~ wherein the three interconnected masses comprise a first mass, a second mass and a third mass and coupled flexures, where the third mass absorbs vibrations of ~~acts as the vibration absorber in~~ the sense-mode oscillator to achieve large sense direction oscillation amplitudes due to mechanical amplification and wherein the drive-mode oscillator and sense-mode oscillator comprise a drive means for driving the first mass, the second mass and the third mass in a drive direction, and a sense means for sensing motion of the third mass in a sense direction.

13. (currently amended) The nonresonant micromachined gyroscope of claim 12 where the third mass comprises an isolated passive mass-spring system and wherein a sinusoidal Coriolis force is applied to the second mass, and where the frequency of the sinusoidal Coriolis force is matched with a resonant frequency of the isolated passive mass-spring system of the third mass and its coupled flexures, so that the third mass achieves maximum dynamic amplification.

14. (currently amended) The nonresonant micromachined gyroscope of claim 1 wherein the drive-mode oscillator and sense-mode oscillator comprise a drive means for driving a mass in a drive direction, and a sense means for sensing motion of a mass in a sense direction, wherein the three interconnected masses comprise a first, second and third mass and coupled flexures, wherein the drive-mode oscillator and sense-mode oscillator each have a frequency response defined by a response curve, wherein the frequency response of both the drive-mode oscillator and sense-mode oscillator have two resonant peaks and a flat region of the response curve between the peaks,

wherein both of the drive-mode oscillator and sense-mode oscillator are operated in the flat region of their response curves, where the second mass has a drive anti-resonance frequency, ω_{2x}, and the third mass has a sense anti-resonance frequency, ω_{3y}, and where the drive anti-resonance frequency, ω_{2x}, of the second mass and sense anti-resonance frequency, ω_{3y}, of the third mass are matched, namely where $\omega_{3y} = \omega_{2x}$, or equivalently $(k_{3y}/m_3)^{1/2} = (k_{2x}/(m_2 + m_3))^{1/2}$ determines ~~the~~ optimal system parameters, together with the optimized ratios $\mu_x = (m_2 + m_3)/m_1$, $\gamma_x = \omega_{2x}/\omega_{1x}$, $\mu_y = m_3/m_2$, and $\gamma_y = \omega_{3y} / \omega_{2y}$, where k_{3y} is the spring constant of the flexures coupled to the third mass, where m_3 is the magnitude of the third mass, k_{2x} is the spring constant of the flexures coupled to the second mass, m_2 is the magnitude of the second mass, m_3 is the magnitude of the third mass, ω_{1x} is the drive anti-resonance frequency of the first mass, and ω_{2y} is the sense anti-resonance frequency of the second mass.

15. (currently amended) A method of operating a nonresonant micromachined gyroscope comprising:

driving a drive-mode oscillator with an applied force;

driving a sense-mode oscillator with a Coriolis force derived from the drive-mode oscillator; and

mechanically decoupling the drive-mode oscillator and sense-mode oscillator~~s~~.

16. (currently amended) The method of claim 15 wherein driving the drive-mode oscillator and driving the sense-mode oscillator dynamically amplifies motion in the drive and sense directions to achieve large oscillation amplitudes without resonance to result

in increased bandwidth and reduced sensitivity to structural and thermal parameter fluctuations and damping changes.

17. (currently amended) The method of claim 15 where mechanically decoupling the drive-mode oscillator and sense-mode oscillators comprises:

mechanically decoupling the drive-mode oscillator and sense-mode oscillators in the drive direction from the sense direction; and

exciting a sense mass ~~element~~ in the sense-mode oscillator by a ~~Coriolis~~ force which is arises from ~~generated by~~ an intermediate ~~proof~~ mass employed in both the drive-mode and sense mode oscillators,

where the intermediate ~~proof~~ mass is ~~being provided with~~ a substantially larger mass than the sense mass ~~element~~, resulting ~~in larger Coriolis forces for~~ increased sensor sensitivity,

~~whereby control system requirements and tight fabrication and packaging tolerances are relaxed, mode-matching eliminated, and instability and zero-rate drift due to mechanical coupling between the drive and sense modes minimized.~~

18. (currently amended) The method of claim 15 wherein driving the drive-mode oscillator and driving the sense-mode oscillator comprises driving a mass in a drive direction and sensing motion of a mass in a sense direction, and wherein the drive-mode oscillator and the sense-mode oscillator comprise three interconnected masses namely a first mass, a second mass and a third mass, exciting the first mass only by a drive means, oscillating the first mass in the drive direction with a driving force and

constraining movement of the first mass in the sense direction, constraining movement of the second and third masses with respect to each other in the drive direction, oscillating the second and third masses together in the drive direction but oscillating the second and third masses independently from each other in the sense direction, the third mass being fixed with respect to the second mass in the drive direction, oscillating the third mass in the sense direction, the first mass as a driven mass and the second and third masses collectively as a passive mass comprising the drive-mode oscillator, the second and third masses comprising the sense-mode oscillator.

19. (currently amended) The method of claim 18 wherein oscillating the second mass in the drive and sense directions generates a rotation-induced ~~Coriolis~~ force that excites the sense-mode oscillator, and detecting a sense direction response of the third mass, which comprises ~~the~~ a vibration absorber of the sense-mode oscillator~~,~~ for measuring ~~the~~ an input angular rate.

20. (currently amended) The method of claim 15 wherein the three interconnected masses comprise a first mass, a second mass and a third mass, and wherein the drive-mode oscillator and sense-mode oscillator comprise a drive means for driving the first mass, the second mass and the third mass ~~a mass~~ in a drive direction, a sense means for sensing motion of the third mass ~~a mass~~ in a sense direction, and a substrate on which the drive-mode oscillator and sense-mode oscillator are disposed, ~~wherein the three interconnected masses comprise a first, second and third mass,~~ further comprising anchoring the first mass to the substrate by a first flexure and moving the

first mass substantially only in the drive direction, moving the second mass coupled to the first mass by a second flexure in the drive and the sense directions, and moving the third mass coupled to the second mass by a third flexure substantially only in the sense direction.

21. (original) The method of claim 20 further comprising coupling the first, second and third masses by the first and third flexures by providing folded micromachined springs having a resiliency substantially in only one direction and by the second flexure which is comprised of two coupled folded micromachined springs, each having a resiliency substantially in only one of two different directions.

22. (currently amended) The method of claim 15 wherein driving the drive-mode oscillator and driving sense-mode oscillator comprises operating the gyroscope in ~~the~~ flat regions of <u>response curves of</u> the drive and sense-mode oscillators between two resonant peaks.

23. (currently amended) The method of claim 22 further comprising matching <u>an anti-resonance drive frequency of the drive-mode oscillator with an anti-resonance sense frequency of the sense-mode oscillator</u> ~~drive and sense direction anti-resonance frequencies of the drive-mode oscillator and sense-mode oscillator~~.

24. (currently amended) The method of claim 15 ~~wherein the drive-mode oscillator and sense-mode oscillator comprise a drive means for driving a mass in a drive~~

~~direction, and a sense means for sensing motion of a mass in a sense direction,~~ wherein the three interconnected masses comprise a first mass, a second mass and a third mass and coupled flexures, the second and the third masses combining to comprise a vibration absorber of the drive-mode oscillator, further comprising mechanically absorbing and amplifying the oscillations of the first mass by means of the vibration absorber and wherein the drive-mode oscillator and sense-mode oscillator comprise a drive means for driving the first mass, the second mass and the third in a drive direction, and a sense means for sensing motion of the third mass in a sense direction.

25. (original) The method of claim 24 further comprising driving the first mass at a driving frequency, ω_{drive}, by means of a input force F_{d}, matching the driving frequency, ω_{drive}, with ~~the~~ a resonant frequency of an isolated passive mass-spring system comprised of the second and third masses and coupled flexures, and moving the passive mass-spring system in resonance with ~~to cancel out the input force Fd applied to~~ the first mass, so that maximum dynamic amplification is achieved.

26. (currently amended) The method of claim 15 wherein driving the drive-mode oscillator and driving sense-mode oscillator comprise driving a drive mass in a drive direction, and sensing motion of a sense mass in a sense direction respectively, and mechanically amplifying sense direction oscillation amplitudes with the sense ~~a third~~ mass acting as the vibration absorber in the sense-mode oscillator.

27. (original) The method of claim 26 further comprising applying a sinusoidal Coriolis force to a second mass, and matching the frequency of the sinusoidal Coriolis force with a resonant frequency of an isolated passive mass-spring system of the third mass and its coupled flexures, so that the third mass achieves maximum dynamic amplification.

28. (currently amended) The method of claim 15 wherein driving the drive-mode oscillator and driving sense-mode oscillator comprise driving a mass in a drive direction, and sensing motion of a mass in a sense direction, wherein the drive-mode oscillator and sense-mode oscillator each have a frequency response defined by a response curve, wherein the frequency response of both the drive-mode oscillator and sense-mode oscillator have two resonant peaks and a flat region of the response curve between the peaks, operating both the drive-mode oscillator and sense-mode oscillator in the flat region of their response curves, , where the second mass has a drive anti-resonance frequency, ω_{2x}, and the third mass has a sense anti-resonance frequency, ω_{3y}, and matching the drive anti-resonance frequency, ω_{2x}, of the second mass and sense anti-resonance frequency, ω_{3y}, of the third mass, namely setting $\omega_{3y} = \omega_{2x}$, or equivalently $(k_{3y}/m_3)^{1/2} = (k_{2x}/(m_2 + m_3))^{1/2}$ and determining therefrom ~~the~~ optimal system parameters, together with the optimized ratios $\mu_x = (m_2 + m_3)/m_1$, $\gamma_x = \omega_{2x}/\omega_{1x}$, $\mu_y = m_3/m_2$, and $\gamma_y = \omega_{3y} / \omega_{2y}$, where k_{3y} is the spring constant of the flexures coupled to the third mass, where m_3 is the magnitude of the third mass, k_{2x} is the spring constant of the flexures coupled to the second mass, m_2 is the magnitude of the second mass, m_3 is the

magnitude of the third mass, ω_{1x} is the drive anti-resonance frequency of the first mass, and ω_{2y} is the sense anti-resonance frequency of the second mass.